Space Weather Forecast

Issued on Thursday, 18 May 2023 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: A relatively quiet solar wind through the period, perhaps enhancing later. Running chance of moderate-class solar flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only C-class flares observed. The largest event was a C9.5 Common-class flare, which peaked at 17/2148 UTC originating from the newly large sunspot region rotating around from the southeast limb (which was the source of the M9.6 Moderate flare on 16th May). There are currently six sunspot regions on the Earth-facing disc, two of which are large and fairly complex. The large sunspot rotating around the southeast limb is showing signs of magnetic complexity as it rotates further onto the disc. A couple of filament lift-offs (arcs of plasma leaving the surface of the Sun) have been observed, although no evidence of these producing any Coronal Mass Ejections (CMEs) in recent imagery. Meanwhile, a Common-class flare at 17/1530 UTC produced a CME off the southwest quadrant. This is currently undergoing analysis for any possible Earth-directed component.

Solar Wind / Geomagnetic Activity: The solar wind speed has been at slightly elevated levels throughout, but on a gradual decline through the last 24 hours. The magnetic properties of the wind have not been favourable for geomagnetic activity, hence the overall geomagnetic activity has been mainly quiet (Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed, although the radiation is slightly elevated above background yesterday afternoon. Levels have since stabilised and remain well below S1 threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity will be mainly Low (C-class), but with a chance of isolated Moderate (M-Class) flares, these most likely caused by the new large region which is currently rotating into view around the southeast limb which has a history of high M-flares.

Solar Wind / Geomagnetic Activity: Solar winds are expected to be near ambient for the most part, with no CMEs or coronal hole fast winds until maybe days 2 and 3 (19th and 20th May) when the wind is likely to pick up a little, offering a higher chance of Unsettled to Active periods (Kp3-4), with a slight chance (10%) of an isolated G1/minor storm (Kp5) .

Energetic Particles / Solar Radiation: No solar radiation storms are expected although may remain slightly elevated for the next couple of days, well below S1 threshold assuming no further large flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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